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| APPLICATION NO.             | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------------------|-------------|----------------------|---------------------|------------------|
| 10/632,568                  | 08/02/2003  | Marcos Kamezos       | CPAC 1017-3         | 2603             |
| 22470                       | 7590        | 03/10/2006           | EXAMINER            |                  |
| HAYNES BEFFEL & WOLFELD LLP |             |                      | MENZ, DOUGLAS M     |                  |
| P O BOX 366                 |             |                      | ART UNIT            |                  |
| HALF MOON BAY, CA 94019     |             |                      | PAPER NUMBER        |                  |
|                             |             |                      | 2891                |                  |

DATE MAILED: 03/10/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/632,568

Applicant(s)

KARNEZOS, MARCOS

Examiner

Douglas M. Menz

Art Unit

2891

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 13 January 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-32 is/are pending in the application.
- 4a) Of the above claim(s) 14-32 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-13 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>1/13/06</u> . | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Admitted Prior Art (APA) in view of Massit et al. (US 5373189).

Regarding claim 1, APA discloses a multipackage module having a second package stacked over a first package (PRIOR ART FIG. 2), each said package comprising a die (24 and 14, PRIOR ART FIG. 2) attached to a first side of a substrate (22 and 12, PRIOR ART FIG. 2), the second package substrate and the first package substrate being interconnected, wherein the first package further comprises solder balls (18, PRIOR ART FIG. 2) connected to bonding pads (123, PRIOR ART FIG. 2) at a second side of the first package substrate (12, PRIOR ART FIG. 2).

APA does not disclose wherein the second package is wire bonded to the first package. Massit discloses a stacked package arrangement wherein the second package substrate (4b, Fig. 1) and the first package substrate (4a, Fig. 1) are interconnected by wire bonds (13b, Fig. 1). It would have been obvious to one of ordinary skill in the art at the time the invention was made to interconnect the substrates

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of APA's structure with wire bonds as taught by Massit (Fig. 1) for the purpose of electrical communication between the various modules as taught by Massit (Col. 4).

Regarding claim 2, APA further discloses wherein at least one said package has wire bond interconnect (16, PRIOR ART FIG. 2) of the die with the substrate, and the said wire bonded package is at least partly encapsulated (PRIOR ART FIG. 2).

Regarding claim 3, APA further disclose wherein the second package has wire bond interconnect of the die (26, PRIOR ART FIG. 2) with the substrate (22, PRIOR ART FIG. 2).

Regarding claim 4, APA further discloses wherein the second package is fully encapsulated (PRIOR ART FIG. 2).

Regarding claim 5, APA further discloses wherein the second package is encapsulated to an extent sufficient to protect wire bonds between the die and the substrate (PRIOR ART FIG. 2).

Regarding claim 6, APA further discloses wherein the second package is a land grid array package (PRIOR ART FIG. 2).

Regarding claim 7, APA further discloses wherein the land grid array package substrate is a single-metal layer substrate (PRIOR ART FIG. 2).

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 8-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Admitted Prior Art (APA) in view of Massit et al. (US 5373189) and further in view of Chen et al. (US 6472741)

Regarding claim 8, APA in view of Massit discloses the structure of claim 1 as mentioned above, however, they do not disclose a heat spreader having a generally planar upper surface exposed at the top of the module. Chen discloses a similar stacked package arrangement, which incorporates a heat spreader (370) having a generally planar upper surface exposed at the top of the module (Fig. 7 and Col. 5, lines: 10-25). It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate Chen's heat spreader into APA's modified structure for the purpose of cooling the semiconductor package as this was commonly done so in the art at the time of the invention.

Regarding claim 9, Chen further discloses wherein a planar part of the heat spreader (370) is supported by support members (371) over the first package substrate (Fig. 7 and Col. 5, lines: 10-25).

Regarding claim 10, Chen further disclose wherein a planar part of the heat spreader (370) is affixed onto an upper surface of the second package (Fig. 7, and Col. 5, lines: 10-25).

Regarding claims 11-13, APA in view of Massit discloses the structure of claim 1 as mentioned above and Chen disclose the structure which incorporates a metal heat spreader (370 and 330, Fig. 7) which encompasses the first and second packages, respectively. It would have been obvious to one of ordinary skill in the art at the time of the invention to realize the heat spreader structure taught by Chen as an electromagnetic shield for at the packages since it is composed of metal.

Regarding claim 13, Chen discloses the second package is affixed onto an upper surface of the heat spreader (330, Fig. 7) which correlates to the electromagnetic shield as discussed above.

### ***Response to Arguments***

Applicant's arguments with respect to claims 1-13 have been considered but are moot in view of the new ground(s) of rejection.

**Conclusion**

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Douglas M. Menz whose telephone number is 571-272-1877. The examiner can normally be reached on M-F 8-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bill Baumeister can be reached on 571-272-1722. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

DM

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